

STK12N05L-VB Datasheet

N-Channel 60-V (D-S) MOSFET

PRODUCT SUMMARY

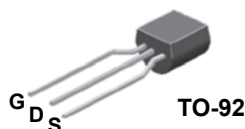
V_{DS} (V)	$R_{DS(on)}$ (Ω)	I_D (A)
60	0.030 at $V_{GS} = 10$ V	8.0
	0.036 at $V_{GS} = 4.5$ V	6.5

FEATURES

- Halogen-free According to IEC 61249-2-21 Definition
- Trench Power MOSFETs
- 175 °C Maximum Junction Temperature
- Compliant to RoHS Directive 2002/95/EC



RoHS
COMPLIANT
HALOGEN
FREE
Available



TO-92



N-Channel MOSFET

ABSOLUTE MAXIMUM RATINGS $T_A = 25$ °C, unless otherwise noted

Parameter		Symbol	10 s	Steady State	Unit
Drain-Source Voltage		V _{DS}	60		V
Gate-Source Voltage		V _{GS}	± 20		
Continuous Drain Current (T _J = 175 °C) ^a	T _A = 25 °C	I _D	8.0	7.0	A
	T _A = 70 °C		6.4	5.6	
Pulsed Drain Current		I _{DM}	40		
Avalanche Current		I _{AS}	15		
Single Pulse Avalanche Energy		E _{AS}	11		mJ
Maximum Power Dissipation ^a	T _A = 25 °C	P _D	3.3	1.7	W
	T _A = 70 °C		2.3	1.2	
Operating Junction and Storage Temperature Range		T _J , T _{sta}	- 55 to 175		°C

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^a	t ≤ 10 s	R _{thJA}	36	45	°C/W
	Steady State		75	90	
Maximum Junction-to-Foot (Drain)	Steady State	R _{thJF}	17	20	

Notes:

a. Surface Mounted on 1" x 1" FR4 board.

SPECIFICATIONS $T_J = 25^\circ\text{C}$, unless otherwise noted

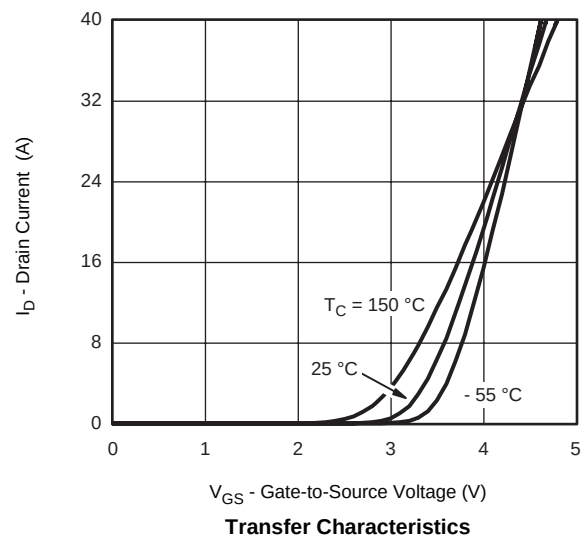
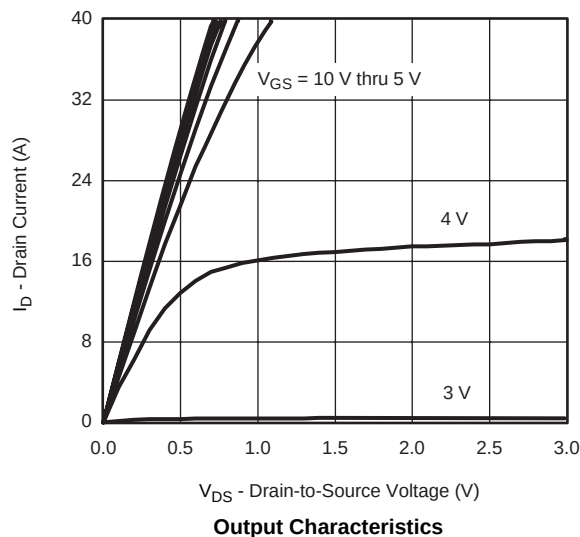
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V_{DS}	$V_{GS} = 0\text{ V}, I_D = 250\text{ }\mu\text{A}$	60			V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\text{ }\mu\text{A}$	1		3	V
Gate-Body Leakage	I_{GSS}	$V_{DS} = 0\text{ V}, V_{GS} = \pm 20\text{ V}$			± 100	nA
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$			1	μA
		$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}, T_J = 55^\circ\text{C}$			20	
On-State Drain Current ^a	$I_{D(on)}$	$V_{DS} \geq 5\text{ V}, V_{GS} = 10\text{ V}$	40			A
Drain-Source On-State Resistance ^a	$R_{DS(on)}$	$V_{GS} = 10\text{ V}, I_D = 6.0\text{ A}$		0.030		Ω
		$V_{GS} = 10\text{ V}, I_D = 6.0\text{ A}, T_J = 125^\circ\text{C}$		0.035		
		$V_{GS} = 10\text{ V}, I_D = 6.0\text{ A}, T_J = 175^\circ\text{C}$		0.040		
		$V_{GS} = 4.5\text{ V}, I_D = 5.1\text{ A}$		0.036		
Forward Transconductance ^a	g_{fs}	$V_{DS} = 15\text{ V}, I_D = 6.0\text{ A}$		25		S
Diode Forward Voltage ^a	V_{SD}	$I_S = 1.7\text{ A}, V_{GS} = 0\text{ V}$		0.8	1.2	V
Dynamic^b						
Total Gate Charge	Q_g	$V_{DS} = 30\text{ V}, V_{GS} = 10\text{ V}, I_D = 6.0\text{ A}$		18	27	nC
Gate-Source Charge	Q_{gs}			3.4		
Gate-Drain Charge	Q_{gd}			5.3		
Gate Resistance	R_g	$V_{GS} = 0.1\text{ V}, f = 5\text{ MHz}$	0.5	1.4	2.4	Ω
Turn-On Delay Time	$t_{d(on)}$	$V_{DD} = 30\text{ V}, R_L = 30\text{ }\Omega$ $I_D \cong 1\text{ A}, V_{GEN} = 10\text{ V}, R_g = 6\text{ }\Omega$		10	20	ns
Rise Time	t_r			10	20	
Turn-Off Delay Time	$t_{d(off)}$			25	50	
Fall Time	t_f			12	24	
Source-Drain Reverse Recovery Time	t_{rr}	$I_F = 1.7\text{ A}, di/dt = 100\text{ A}/\mu\text{s}$		50	80	

Notes:

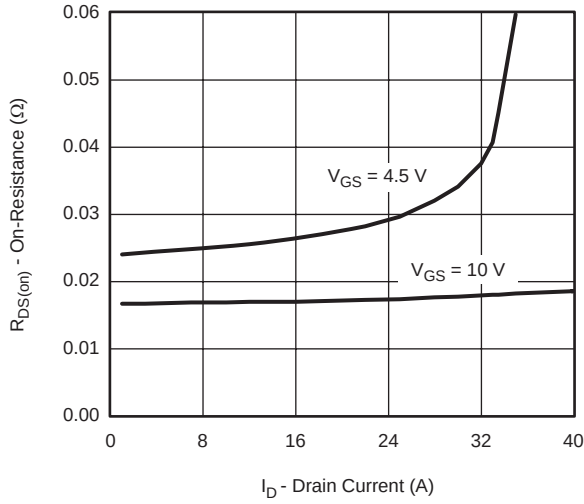
a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

b. Guaranteed by design, not subject to production testing.

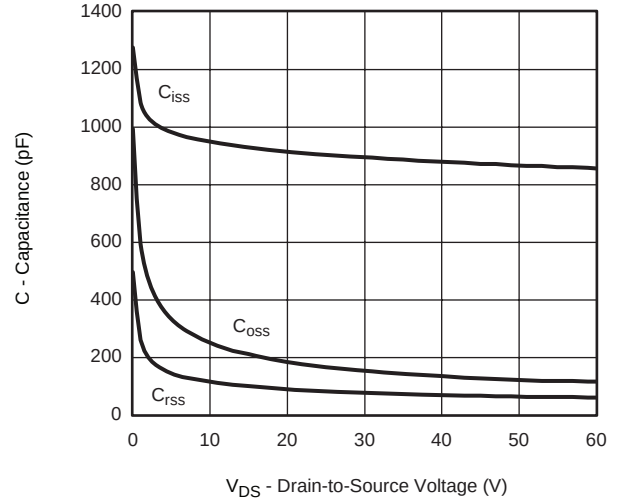
Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

TYPICAL CHARACTERISTICS 25°C , unless otherwise noted

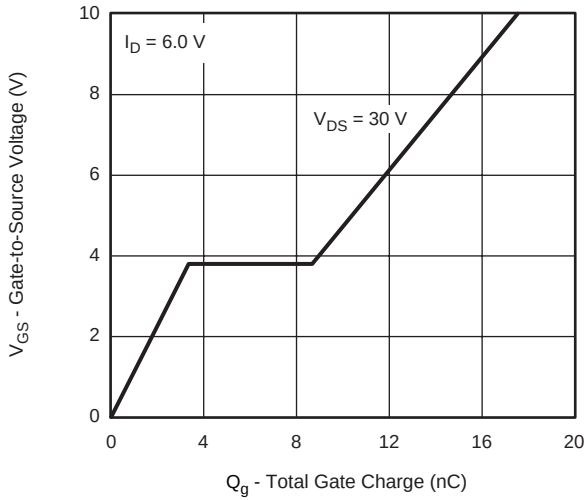
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



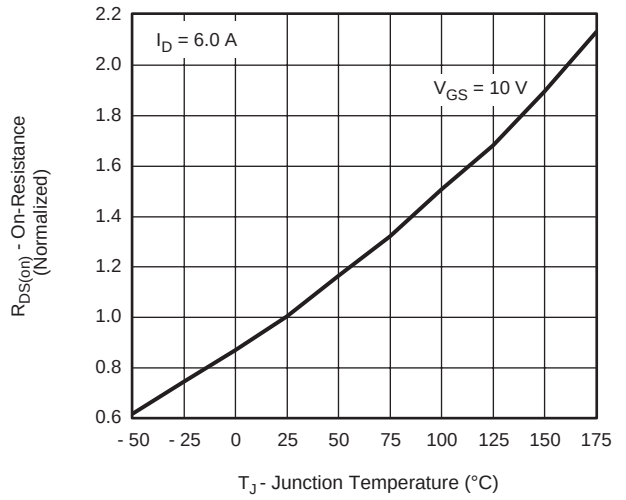
On-Resistance vs. Drain Current



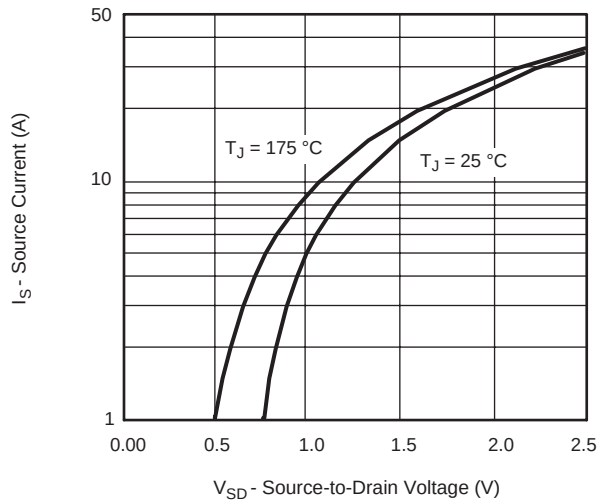
Capacitance



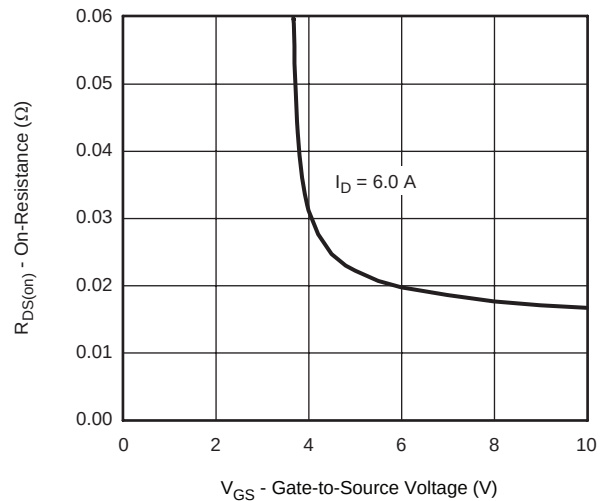
Gate Charge



On-Resistance vs. Junction Temperature

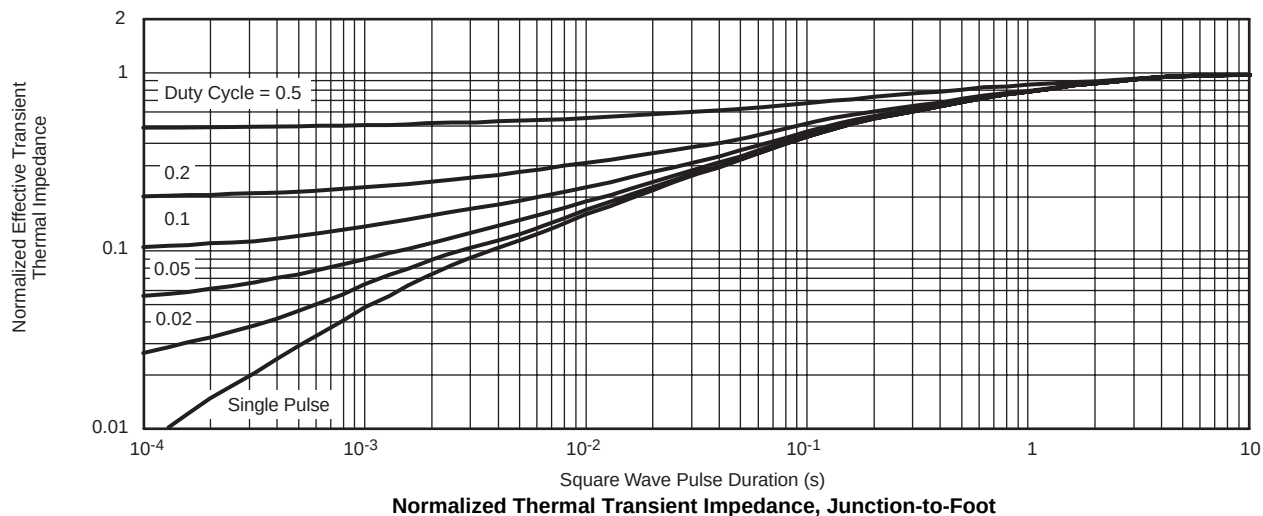
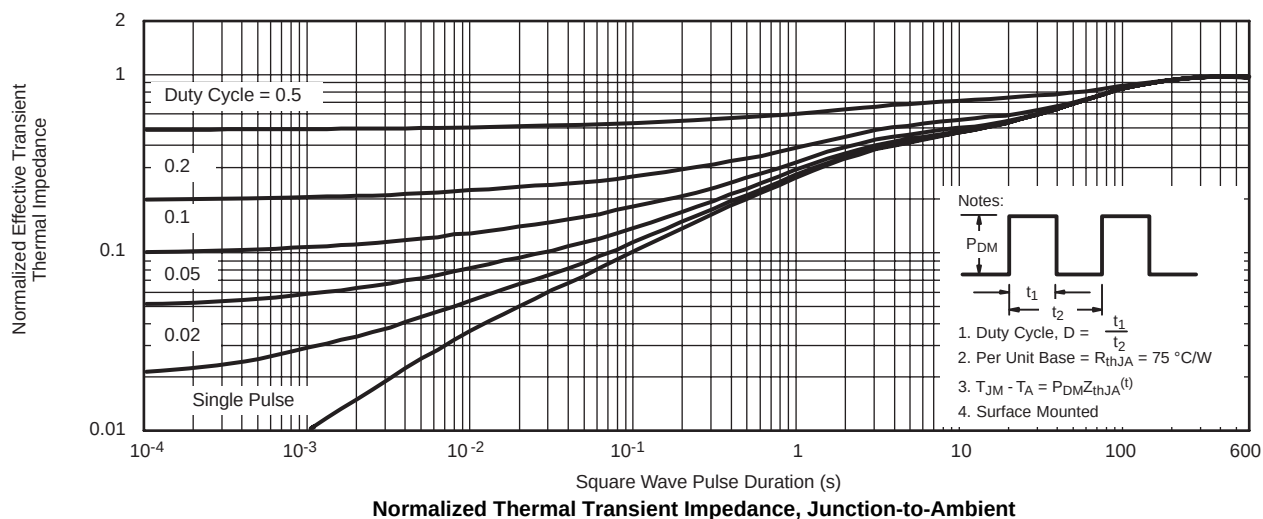
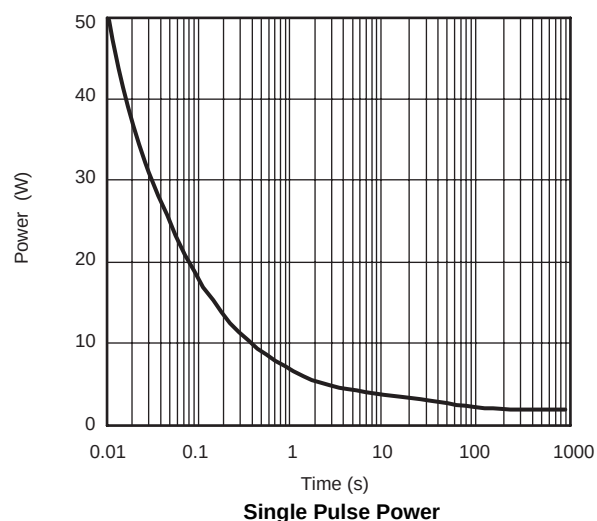
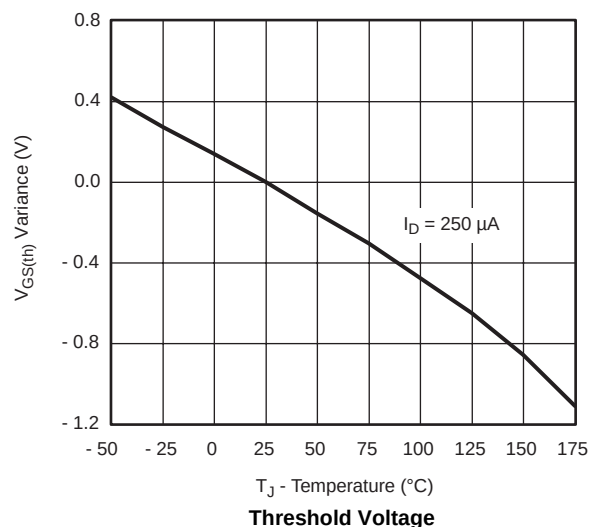


Source-Drain Diode Forward Voltage



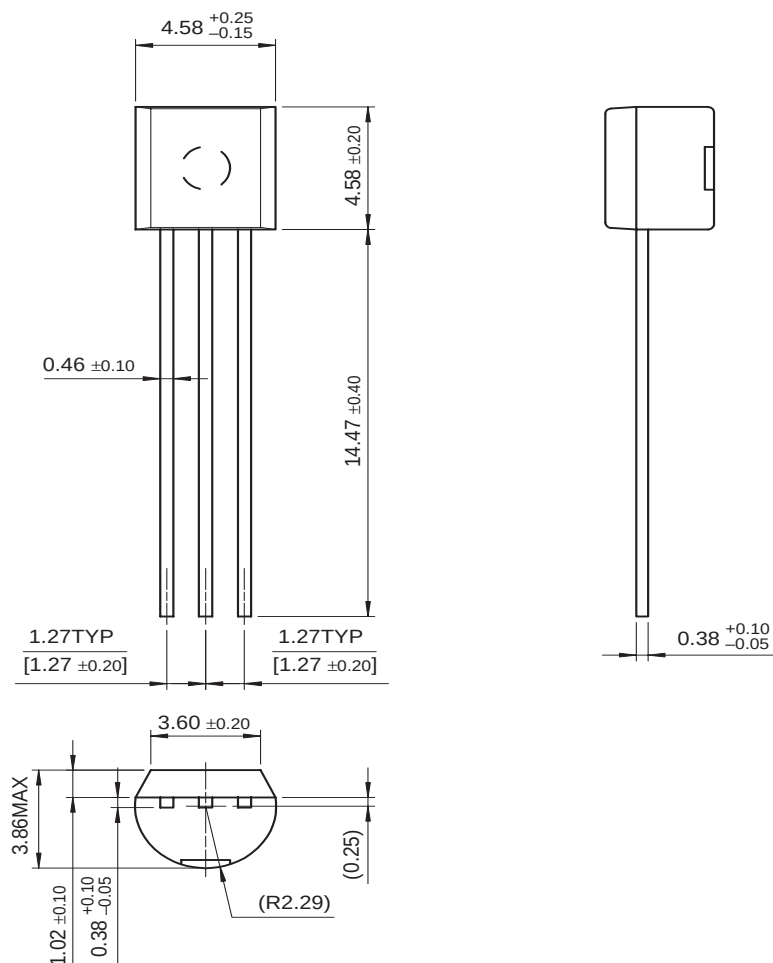
On-Resistance vs. Gate-to-Source Voltage

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



Mechanical Dimensions

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